continuation-in-part of Application No. 08/166,153 filed Dec. 14, 1993, which is a continuation of Application No. 07/991,421 filed Dec. 16, 1992, abandoned.

IN THE CLAIMS:

26. (Amended) A projection exposure apparatus comprising:

an illumination optical system in which an optical device is disposed on an optical axis to form an annular secondary light source with light from a first light source; and

a projection optical system;

said illumination optical system satisfying the following condition:

$$1/3 \leq d_1/d_2 \leq 2/3$$

wherein d_1 is an inner diameter of the secondary light source and d_2 is an outer diameter of the secondary light source.

27. (Amended) A projection exposure apparatus comprising:

an illumination optical system disposed on an optical path along which light irradiated on a mask from an annular illumination source passes; and

a projection optical system;

said illumination optical system satisfying the following condition:

$$0.45 \leq NA_2/NA_1 \leq 0.8$$

wherein NA_1 is the numerical aperture of said projection optical system, and NA_2 is the numerical aperture of said illumination optical system determined by the outer diameter of said annular illumination source;

said illumination optical system including an optical device disposed on the optical axis to change a value of NA_2/NA_1.

28. (Amended) A projection exposure apparatus comprising:

an illumination optical system disposed on an optical path along which light irradiated on a mask from an annular illumination source passes, said illumination optical system including an optical member that changes an annular ratio of the annular illumination source in accordance with a pattern formed on the mask; and

a projection optical system disposed between the mask and a substrate onto which the pattern is transferred.

29. (Amended) A projection exposure apparatus comprising:

an illumination optical system disposed between a first light source and a mask;

a projection system disposed between the mask and a substrate; and

an optical device disposed within the illumination optical system, that forms a plurality of secondary light sources, including a substantially annular secondary light source and a substantially circular secondary light source, with light from the first light source, to illuminate the mask with light from one of the plurality of secondary light sources, the optical device changing an annular ratio of the annular secondary light source and changing a size of the circular secondary light source.

Please add the following claims:

--91. An apparatus according to claim 26, wherein said optical device includes an optical integrator and an optical element having a conical surface, disposed between said first light source and the optical integrator.--

--~~92~~ 28. An apparatus according to claim ~~91~~ 27, wherein said optical integrator includes a fly-eye type integrator or an internal reflection type integrator.--

--93. An apparatus according to claim 26, wherein said optical device satisfies the following condition:

$$0.45 \leq NA_2/NA_1 \leq 0.8$$

wherein NA_1 is the numerical aperture of said projection optical system, and NA_2 is the numerical aperture

of said illumination optical system determined by the outer diameter of said annular secondary light source.--

--94. An apparatus according to claim 27, wherein said illumination optical system includes an optical integrator and a stop disposed adjacent to the optical integrator to form said annular illumination source.--

--95. An apparatus according to claim 27, wherein said optical device changes the annular ratio of said annular illumination source in accordance with a pattern on said mask.--

--96. An apparatus according to claim 95, wherein said optical device includes a plurality of annular stops having annular ratios that are different from each other, one of the plurality of annular stops selected in accordance with said pattern being disposed on said optical path.--

--97. A projection exposure apparatus comprising:

an illumination optical system in which an internal reflection type integrator is disposed on an optical axis to illuminate a mask with light from a light source passing through the internal reflection type integrator; and

a projection optical system through which light from the mask passes;